What is claimed is:

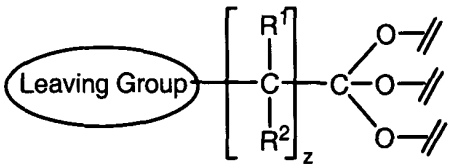
1. A method for making an ortho ester of a water-soluble polymer comprising the step of reacting a water-soluble polymer segment having at least one alkoxide ion or thiolate ion with an ortho ester comprised of a suitable leaving group.

2. The method of claim 1, wherein the water-soluble polymer segment has at least one alkoxide ion and is prepared via a polymerization reaction.

3. The method of claim 1, wherein the water-soluble polymer segment having at least one alkoxide ion or thiolate ion is prepared by combining a water-soluble polymer segment having at least one hydroxyl or thiol moiety with a suitable base.

4. The method of claim 3, wherein the suitable base is selected from the group consisting of sodium, potassium, sodium hydride, potassium hydride, sodium methoxide, potassium methoxide, sodium tert-butoxide, and potassium tert-butoxide.

5. The method of claim 1, wherein the ortho ester comprised of a suitable leaving group comprises the following structure:



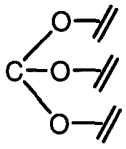
wherein:

is the suitable leaving group;

(z) is an integer from 1 to 24;

R^1, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl;

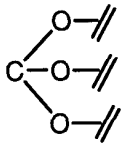
R^2, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl; and

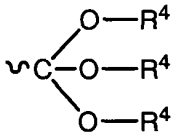
 represents a residue of a ortho ester moiety.

6. The method of claim 5, wherein the suitable leaving group is selected from the group consisting of halogens and sulfonate esters.

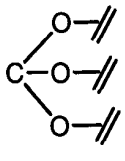
7. The method of claim 5, wherein the suitable leaving group is selected from the group consisting of bromo, chloro and iodo.

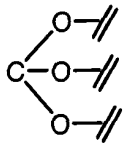
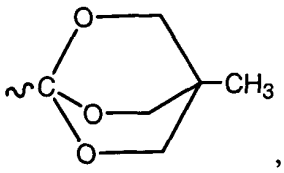
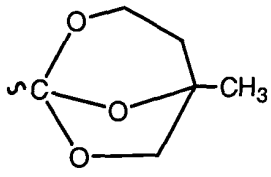
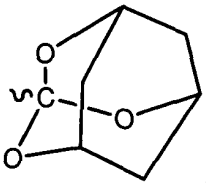
8. The method of claim 5, wherein the suitable leaving group is selected from the group consisting of methanesulfonate, trifluoromethanesulfonate, trichloromethanesulfonate, 2,2,2-trifluoroethanesulfonate, 2,2,2-trichloroethanesulfonate, and para-toluenesulfonate.

9. The method of claim 5, wherein the  moiety is comprised of the following structure:

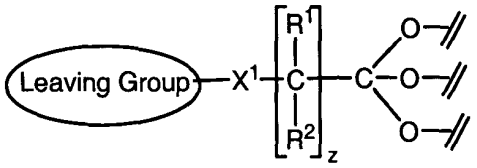


wherein each R^4 is an organic radical independently selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl.

10. The method of claim 5, wherein the  moiety is in the form of a cyclic structure.

11. The method of claim 10, wherein the  moiety is selected from the group consisting of  ,  and  .

12. The method of claim 5, wherein the ortho ester comprised of a suitable leaving group comprises the following structure:



wherein:

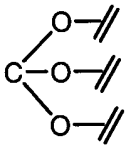
 is the suitable leaving group;

X^1 is a spacer moiety;

(z) is an integer from 1 to 24;

R^1, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl;

R^2, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl; and

 represents a residue of a ortho ester moiety.

13. The method of claim 5, wherein the ortho ester moiety comprised of a suitable leaving group is prepared via a polymerization reaction conducted on an initiator molecule having an ortho ester moiety.

14. The method of claim 1, wherein the water-soluble polymer segment having at least one alkoxide ion or thiolate ion is comprised of the following structure:

$$POLY—(X)_a—Y^-$$

wherein POLY is a water-soluble polymer segment;

(a) is zero or one;

X, when present, is a spacer moiety; and

Y is O or S.

15. The method of claim 14, wherein the water-soluble polymer segment having at least one alkoxide ion or thiolate ion is comprised of the following structure:

$$R^5—O—(CH_2CH_2O)_m\text{-}CH_2CH_2\text{-}Y^-$$

wherein:

(m) is from 2 to 4000;

Y is O or S; and

R^5 is H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl.

16. The method of claim 3, wherein the water-soluble polymer segment having at least one hydroxyl or thiol group is comprised of the following structure:

$$POLY—(X)_a—YH$$

wherein:

POLY is a water-soluble polymer segment;

(a) is zero or one;

X, when present, is a spacer moiety; and

Y is O or S.

17. The method of claim 16, wherein the water-soluble polymer segment has one hydroxyl group and is comprised of the following structure:

$$R^5—O—(CH_2CH_2O)_m—H$$

wherein:

(m) is from 2 to 4000; and

R^5 is H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl.

18. The method of claim 17, wherein the water-soluble polymer segment having one hydroxyl group is comprised of the following structure:

$$H_3C—O—(CH_2CH_2O)_m—H$$

wherein (m) is from 2 to 4000.

19. A method for making a carboxylic acid of a water-soluble polymer comprising the steps of

(a) reacting a water-soluble polymer segment having at least one alkoxide ion or thiolate ion with an ortho ester comprised of a suitable leaving group to form an ortho ester of a water-soluble polymer; and

(b) subjecting the ortho ester of a water-soluble polymer formed in step (a) to at least one hydrolysis step so as to provide the corresponding carboxylic acid of a water-soluble polymer.

20. The method of claim 19, wherein the water-soluble polymer segment having at least one alkoxide ion or thiolate ion is prepared by combining a water-soluble polymer segment having at least one hydroxyl or thiol moiety with a suitable base.

21. The method of claim 19, further comprising the step of recovering the carboxylic acid of the water-soluble polymer.

22. The method of claim 19, further comprising the step of purifying the carboxylic acid of the water-soluble polymer.

23. The method of claim 19, wherein conversion of the ortho ester of the water-soluble polymer into the carboxylic acid of the water-soluble polymer is about 85% or greater.

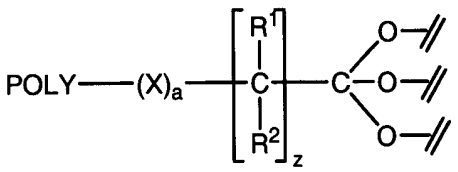
24. The method of claim 19, wherein the at least one hydrolysis step comprises two hydrolysis steps.

25. The method of claim 24, wherein the two hydrolysis steps comprise an initial acid hydrolysis step followed by a base hydrolysis step.

26. A carboxylic acid of a water-soluble polymer prepared by the method of claim 19.

27. An ortho ester of a water-soluble polymer.

28. A polymer comprising the following structure:



wherein:

POLY is a water-soluble polymer segment;

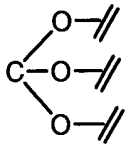
(a) is either zero or one;

X, when present, is a spacer moiety;

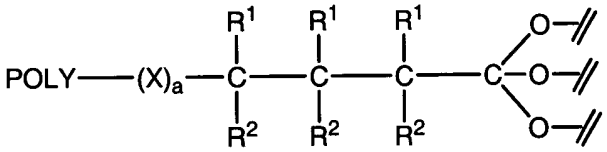
(z) is an integer from 1 to 24;

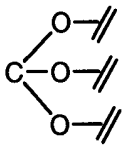
R^1, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl;

R^2, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl; and

 represents a residue of a ortho ester moiety.

29. The polymer of claim 28, wherein (z) equals three and the polymer is comprised of the following structure:

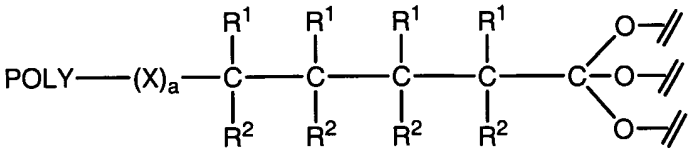


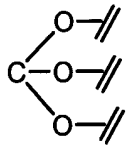
wherein POLY, X, (a), each R^1, each R^2 and  are as previously defined.

30. The polymer of claim 29, wherein each occurrence of R^1 and R^2 is H.

31. The polymer of claim 29, wherein the R^1 attached to the carbon α to the carbon in the ortho ester moiety is alkyl, all other R^1 variables are H, and all R^2 variables are H.

32. The polymer of claim 28, wherein (z) equals four and the polymer is comprised of the following structure:

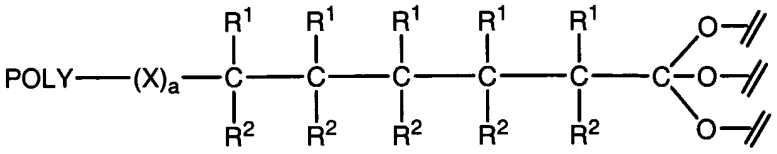


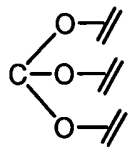
wherein POLY, X, (a), each R^1, each R^2 and  are as previously defined.

33. The polymer of claim 32, wherein each occurrence of R^1 and R^2 is H.

34. The polymer of claim 32, wherein the R^1 attached to the carbon α to the carbon in the ortho ester moiety is alkyl, all other R^1 variables are H, and all R^2 variables are H.

35. The polymer of claim 28, wherein (z) equals five and the polymer is comprised of the following structure:



wherein POLY, X, (a), each R^1, each R^2 and  are as previously defined.

36. The polymer of claim 35, wherein each occurrence of R^1 and R^2 is H.

37. The polymer of claim 35, wherein the R^1 attached to the carbon α to the carbon in the ortho ester moiety is alkyl, all other R^1 variables are H, and all R^2 variables are H.

38. The polymer of claim 28, wherein POLY is selected from the group consisting of a poly(alkylene oxide)s, poly(vinyl pyrrolidone), poly(vinyl alcohol), polyoxazoline, poly(acryloylmorpholine), and poly(oxyethylated polyol).

39. The polymer of claim 38, wherein POLY is a poly(alkylene oxide).

40. The polymer of claim 39, wherein the poly(alkylene oxide) is a poly(ethylene glycol).

41. The polymer of claim 40, wherein the poly(ethylene glycol) is terminally capped with an end-capping moiety.

42. The polymer of claim 41, wherein the end-capping moiety is independently selected from the group consisting alkoxy, substituted alkoxy, alkenyloxy, substituted alkenyloxy, alkynyloxy, substituted alkynyloxy, aryloxy, substituted aryloxy, and hydroxy.

43. The polymer of claim 42, wherein the end-capping moiety is alkoxy.

44. The polymer of claim 43, wherein the alkoxy is methoxy.

45. The polymer of claim 42, wherein the end-capping moiety is hydroxy.

46. The polymer of claim 40, wherein the poly(ethylene glycol) has a nominal average molecular mass of from about 100 daltons to about 100,000 daltons.

47. The polymer of claim 46, wherein the poly(ethylene glycol) has a nominal average molecular mass of from about 2,000 daltons to about 25,000 daltons.

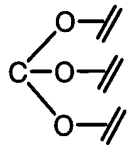
48. The polymer of claim 47, wherein the poly(ethylene glycol) has a nominal average molecular mass of from about 5,000 daltons to about 20,000 daltons.

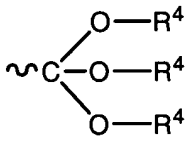
49. The polymer of claim 28, wherein (a) equals zero.

50. The polymer of claim 28, wherein (a) equals one.

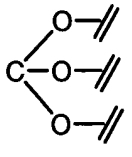
51. The polymer of claim 50, wherein X is independently selected from the group consisting of -O-, -S-, -C(O)-, -C(O)-NH-, -NH-C(O)-NH-, -O-C(O)-NH-, -C(S)-, $-CH_2-$, $-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-CH_2-$, $-O-CH_2-$, $-CH_2-O-$, $-O-CH_2-CH_2-$, $-CH_2-O-CH_2-$, $-CH_2-CH_2-O-$, $-O-CH_2-CH_2-CH_2-$, $-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-O-CH_2-$, $-CH_2-CH_2-CH_2-O-$, $-O-CH_2-CH_2-CH_2-CH_2-$, $-CH_2-O-CH_2-CH_2-CH_2-$, $-CH_2-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-O-CH_2-$, $-CH_2-CH_2-CH_2-CH_2-O-$, -C(O)-NH-CH_2-, -C(O)-NH-CH_2-CH_2-, $-CH_2-$C(O)-NH-CH_2-, $-CH_2-CH_2-$C(O)-NH-, -C(O)-NH-$CH_2-CH_2-CH_2-$, $-CH_2-$C(O)-NH-CH_2-CH_2-, $-CH_2-CH_2-$C(O)-NH-CH_2-, $-CH_2-CH_2-CH_2-$C(O)-NH-, -C(O)-NH-$CH_2-CH_2-CH_2-CH_2-$, $-CH_2-$C(O)-NH-$CH_2-CH_2-CH_2-$, $-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-, $-CH_2-CH_2-CH_2-CH_2-$C(O)-NH-, -C(O)-O-CH_2-, $-CH_2-$C(O)-O-CH_2-, $-CH_2-CH_2-$C(O)-O-CH_2-, -C(O)-O-CH_2-CH_2-, -NH-C(O)-CH_2-, $-CH_2-$NH-C(O)-CH_2-, $-CH_2-CH_2-$NH-C(O)-CH_2-, -NH-C(O)-CH_2-CH_2-, $-CH_2-$NH-C(O)-CH_2-CH_2-, $-CH_2-CH_2-$NH-C(O)-CH_2-CH_2-, -C(O)-NH-CH_2-, -C(O)-NH-CH_2-CH_2-, -O-C(O)-NH-CH_2-, -O-C(O)-NH-CH_2-CH_2-, -NH-CH_2-, -NH-CH_2-CH_2-, $-CH_2-$NH-CH_2-, $-CH_2-CH_2-$NH-CH_2-, -C(O)-CH_2-, -C(O)-CH_2-CH_2-, $-CH_2-$C(O)-CH_2-, $-CH_2-CH_2-$C(O)-CH_2-, $-CH_2-CH_2-$C(O)-CH_2-CH_2-, $-CH_2-CH_2-$C(O)-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-NH-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-NH-C(O)-,

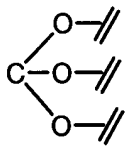
$-CH_2-CH_2-CH_2-C(O)-NH-CH_2-CH_2-NH-C(O)-CH_2-$,
$-CH_2-CH_2-CH_2-C(O)-NH-CH_2-CH_2-NH-C(O)-CH_2-CH_2-$, $-O-C(O)-NH-[CH_2]_h-(OCH2CH2)_j-$,
$-C(O)-NH-(CH_2)_{1-6}-NH-C(O)-$, $-NH-C(O)-NH-(CH_2)_{1-6}-NH-C(O)-$, and
$-O-C(O)-NH-(CH_2)_{1-6}-NH-C(O)-$,bivalent cycloalkyl group, an amino acid, $-N(R^6)-$, and combinations of two or more of any of the foregoing, wherein R^6 is H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl and substituted aryl, (h) is zero to six, and (j) is zero to 20.

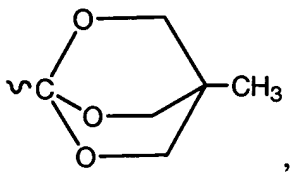
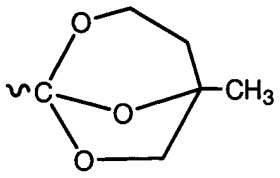
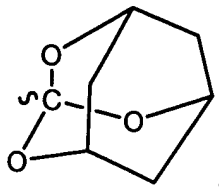
52. The polymer of claim 28, wherein the  moiety is comprised of the following structure:



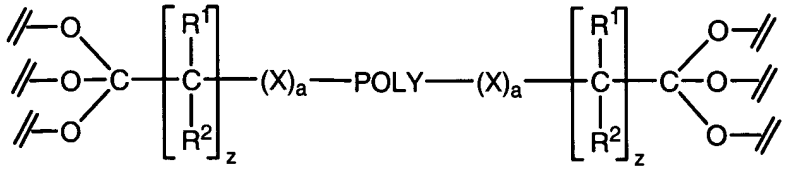
wherein each R^4 is independently an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl.

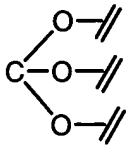
53. The polymer of claim 28, wherein the  moiety is in the form of a cyclic structure.

54. The polymer of claim 53, wherein the  moiety is selected from the group

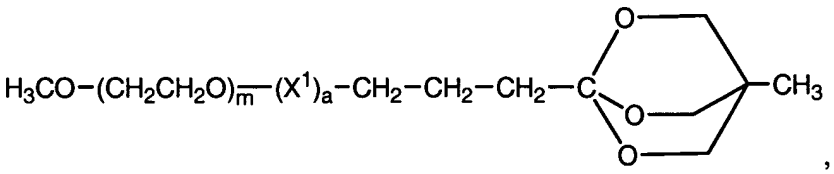
consisting of  ,  , and  .

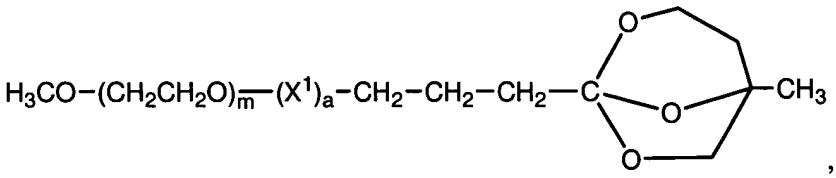
55. The polymer of claim 28, comprising the following structure:

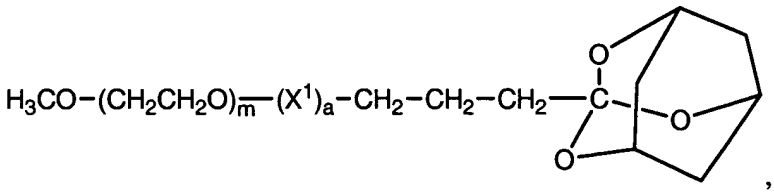


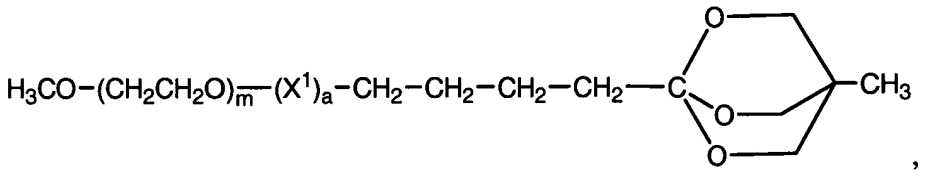
wherein POLY, each X, each (a), each R^1, each R^2, and each  are as described above.

56. The polymer of claim 28, selected from the group consisting of

 ,

 ,

 ,



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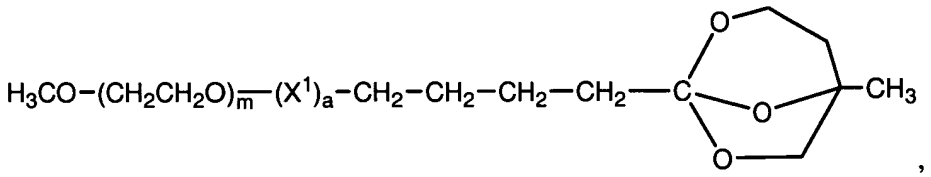

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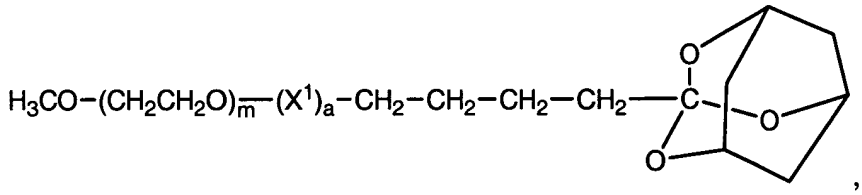

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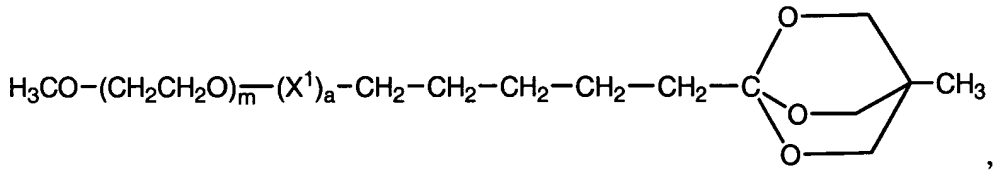

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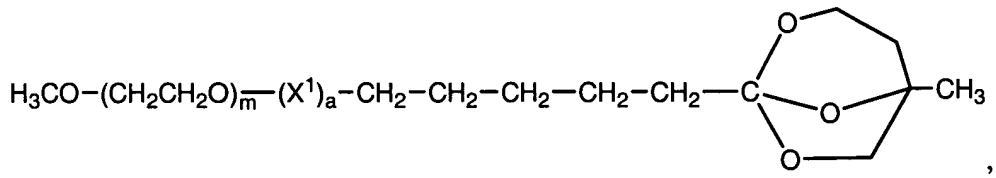

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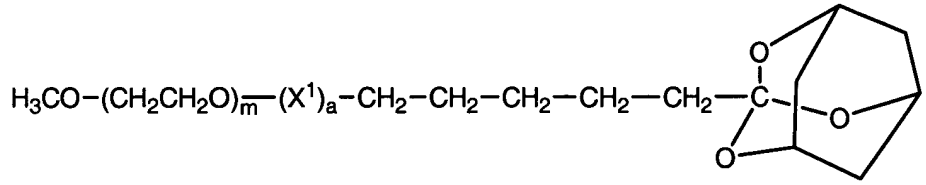

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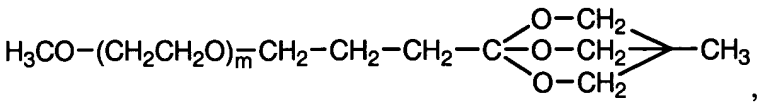

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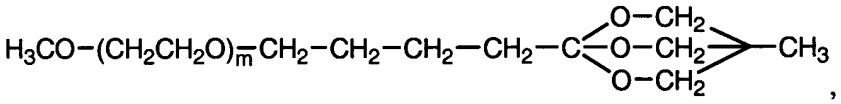

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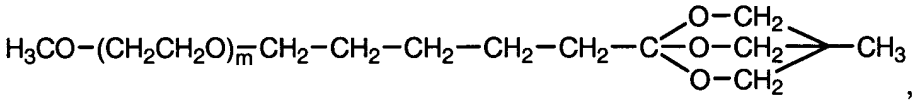

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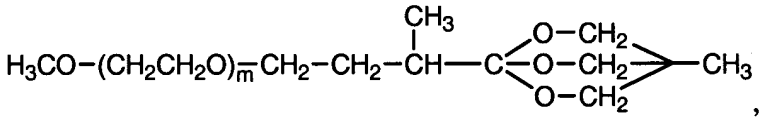

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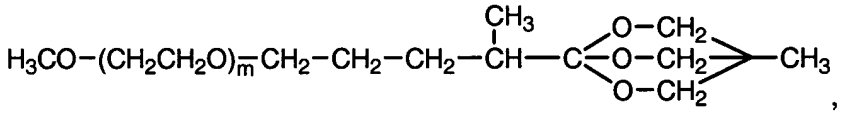

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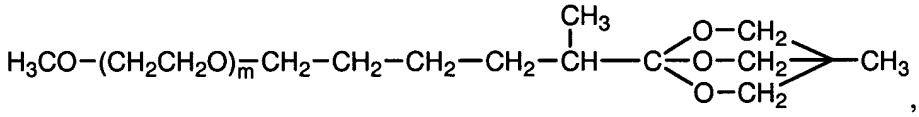

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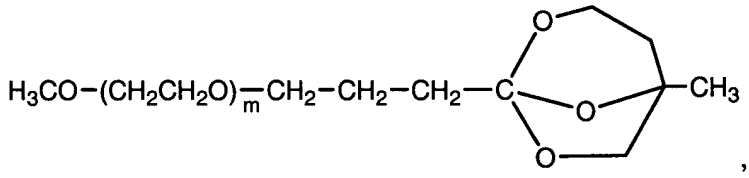

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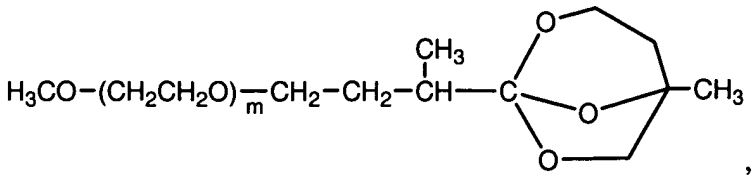

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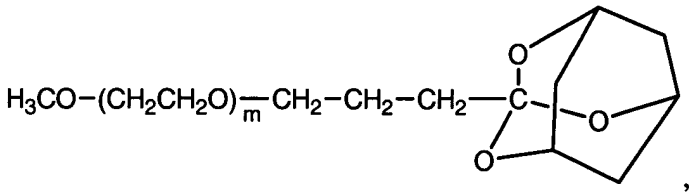

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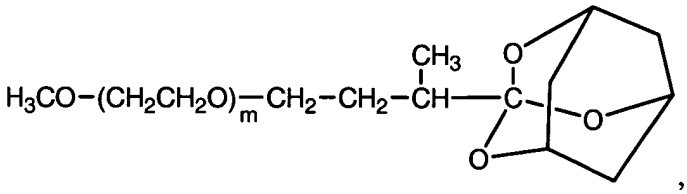

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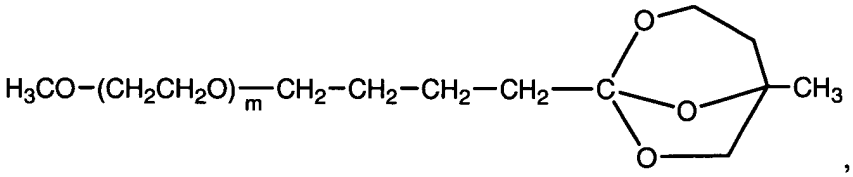

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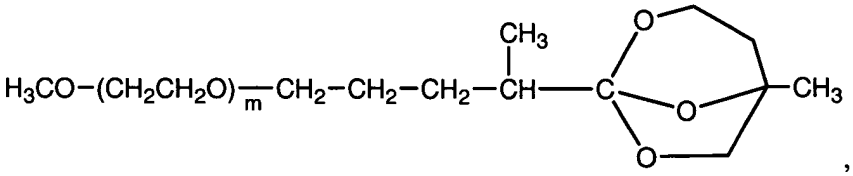

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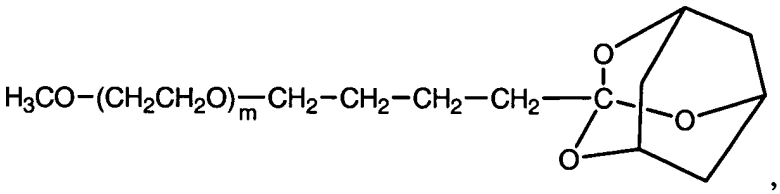

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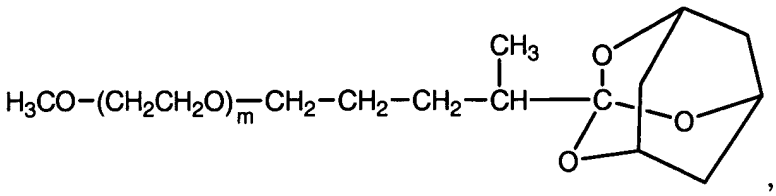

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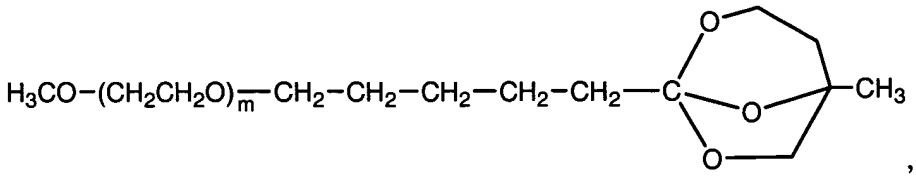

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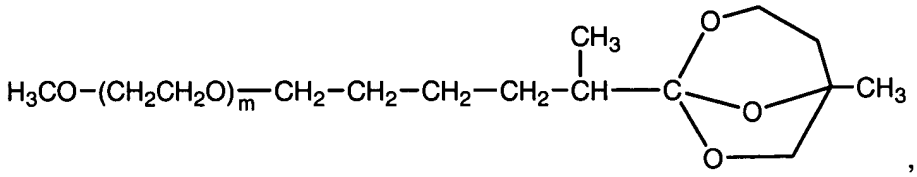

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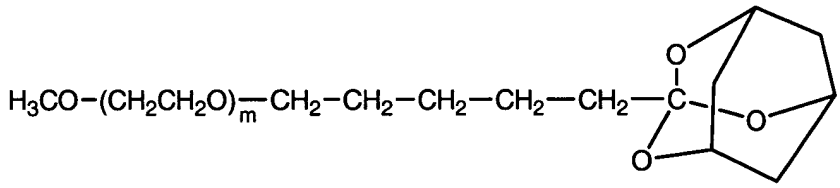

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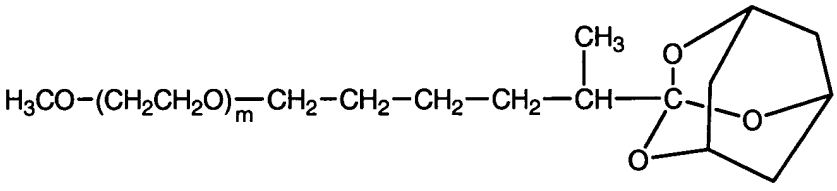

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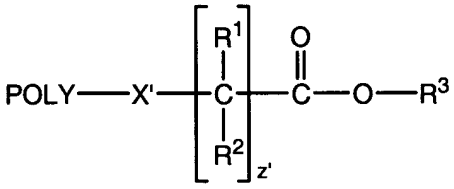
wherein (m) is 2 to 4000, (a) is zero or one, and X^1, when present, is a spacer moiety.

57. A polymer comprising a water-soluble polymer segment and a carbon chain of four or more carbon atoms terminating in a carboxylic acid or nonaromatic ester thereof wherein the water-soluble polymer segment is covalently attached through one or more atoms to a carbon atom in the carbon chain that is at least four carbon atoms distal to the carbonyl carbon in the

carboxylic acid or nonaromatic ester thereof, and further wherein when the water-soluble polymer segment is covalently attached through only one atom, the one atom is not O or S.

58. A polymer comprising the following structure:



wherein:

POLY is a water-soluble polymer segment;

X' is a spacer moiety with the proviso that when the spacer moiety is only one atom, the one atom is not O or S;

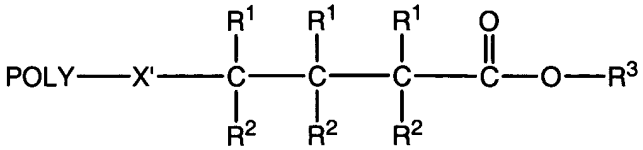
(z') is an integer from 3 to 24;

R^1, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl;

R^2, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl; and

R^3 is H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, and substituted alkynyl.

59. The polymer of claim 58, wherein (z') equals three and the polymer is comprised of the following structure:



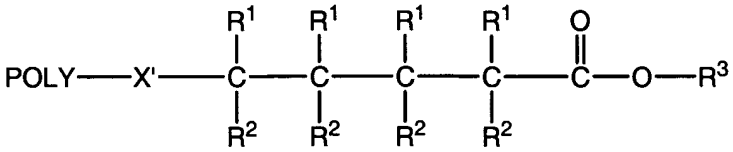
wherein POLY, X', each R^1, each R^2 and R^3 are as previously defined.

60. The polymer of claim 59, wherein R^3 is H.

61. The polymer of claim 59, wherein each occurrence of R^1 and R^2 is H.

62. The polymer of claim 59, wherein the R^1 attached to the carbon α to the carbonyl carbon is alkyl, all other R^1 variables are H, and all R^2 variables are H.

63. The polymer of claim 58, wherein (z') equals four and the polymer is comprised of the following structure:



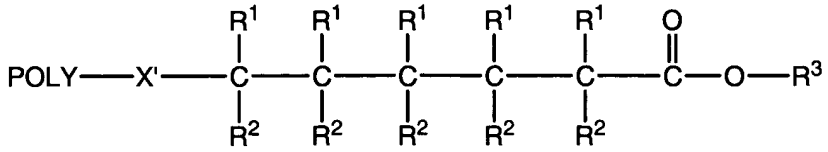
wherein POLY, X', each R^1, each R^2 and R^3 are as previously defined.

64. The polymer of claim 63, wherein R_3 is H.

65. The polymer of claim 63, wherein each occurrence of R^1 and R^2 is H.

66. The polymer of claim 63, wherein the R^1 attached to the carbon α to the carbonyl carbon is alkyl, all other R^1 variables are H, and all R^2 variables are H.

67. The polymer of claim 58, wherein (z') equals five and the polymer is comprised of the following structure:



wherein POLY, X', each R^1, each R^2 and R^3 are as previously defined.

68. The polymer of claim 67, wherein R_3 is H.

69. The polymer of claim 67, wherein each occurrence of R^1 and R^2 is H.

70. The polymer of claim 67, wherein the R^1 attached to the carbon α carbon to the carbonyl carbon is alkyl, all other R^1 variables are H, and all R^2 variables are H.

71. The polymer of claim 58, wherein POLY is selected from the group consisting of a poly(alkylene oxide)s, poly(vinyl pyrrolidone), poly(vinyl alcohol), polyoxazoline, poly(acryloylmorpholine), and poly(oxyethylated polyols).

72. The polymer of claim 71, wherein POLY is a poly(alkylene oxide).

73. The polymer of claim 72, wherein the poly(alkylene oxide) is a poly(ethylene glycol).

74. The polymer of claim 73, wherein the poly(ethylene glycol) is terminally capped with an end-capping moiety.

75. The polymer of claim 74, wherein the end-capping moiety is independently selected from the group consisting alkoxy, substituted alkoxy, alkenyloxy, substituted alkenyloxy, alkynyloxy, substituted alkynyloxy, aryloxy, substituted aryloxy, and hydroxy.

76. The polymer of claim 75, wherein the end-capping moiety is alkoxy.

77. The polymer of claim 76, wherein the alkoxy is methoxy.

78. The polymer of claim 75, wherein the end-capping moiety is hydroxy.

79. The polymer of claim 73, wherein the poly(ethylene glycol) has a nominal average molecular mass of from about 100 daltons to about 100,000 daltons.

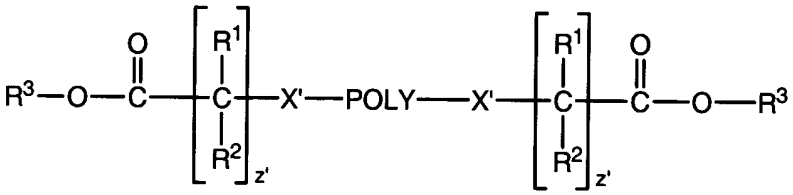
80. The polymer of claim 79, wherein the poly(ethylene glycol) has a nominal average molecular mass of from about 2,000 daltons to about 25,000 daltons.

81. The polymer of claim 80, wherein the poly(ethylene glycol) has a nominal average molecular mass of from about 5,000 daltons to about 20,000 daltons.

82. The polymer of claim 58, wherein X' is selected from the group consisting of -C(O)-, -C(O)-NH-, -NH-C(O)-NH-, -O-C(O)-NH-, -C(S)-, $-CH_2-$, $-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-CH_2-$, $-O-CH_2-$, $-CH_2-O-$, $-O-CH_2-CH_2-$, $-CH_2-O-CH_2-$, $-CH_2-CH_2-O-$, $-O-CH_2-CH_2-CH_2-$, $-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-O-CH_2-$, $-CH_2-CH_2-CH_2-O-$, $-O-CH_2-CH_2-CH_2-CH_2-$, $-CH_2-O-CH_2-CH_2-CH_2-$, $-CH_2-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-CH_2-O-CH_2-$, $-CH_2-CH_2-CH_2-CH_2-O-$, -C(O)-NH-CH_2-, -C(O)-NH-CH_2-CH_2-, $-CH_2-$C(O)-NH-CH_2-, $-CH_2-CH_2-$C(O)-NH-, -C(O)-NH-$CH_2-CH_2-CH_2-$, $-CH_2-$C(O)-NH-CH_2-CH_2-, $-CH_2-CH_2-$C(O)-NH-CH_2-, $-CH_2-CH_2-CH_2-$C(O)-NH-, -C(O)-NH-$CH_2-CH_2-CH_2-CH_2-$, $-CH_2-$C(O)-NH-$CH_2-CH_2-CH_2-$, $-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-, $-CH_2-CH_2-CH_2-CH_2-$C(O)-NH-, -C(O)-O-CH_2-, $-CH_2-$C(O)-O-CH_2-, $-CH_2-CH_2-$C(O)-O-CH_2-, -C(O)-O-CH_2-CH_2-, -NH-C(O)-CH_2-, $-CH_2-$NH-C(O)-CH_2-, $-CH_2-CH_2-$NH-C(O)-CH_2-, -NH-C(O)-CH_2-CH_2-, $-CH_2-$NH-C(O)-CH_2-CH_2-, $-CH_2-CH_2-$NH-C(O)-CH_2-CH_2-, -C(O)-NH-CH_2-, -C(O)-NH-CH_2-CH_2-, -O-C(O)-NH-CH_2-, -O-C(O)-NH-CH_2-CH_2-, -NH-CH_2-, -NH-CH_2-CH_2-, $-CH_2-$NH-CH_2-, $-CH_2-CH_2-$NH-CH_2-, -C(O)-CH_2-, -C(O)-CH_2-CH_2-, $-CH_2-$C(O)-CH_2-, $-CH_2-CH_2-$C(O)-CH_2-, $-CH_2-CH_2-$C(O)-CH_2-CH_2-, $-CH_2-CH_2-$C(O)-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-NH-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-NH-C(O)-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-NH-C(O)-CH_2-, $-CH_2-CH_2-CH_2-$C(O)-NH-CH_2-CH_2-NH-C(O)-CH_2-CH_2-, -O-C(O)-NH-$[CH_2]_h$-$(OCH2CH2)_j$-,

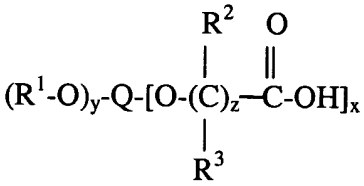
-C(O)-NH-$(CH_2)_{1-6}$-NH-C(O)-, -NH-C(O)-NH-$(CH_2)_{1-6}$-NH-C(O)-, and -O-C(O)-NH-$(CH_2)_{1-6}$-NH-C(O)-,bivalent cycloalkyl group, an amino acid, -N(R^6)-, and combinations of two or more of any of the foregoing, wherein R^6 is H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl and substituted aryl, (h) is zero to six, and (j) is zero to 20.

83. The polymer of claim 58, comprising the following structure:



wherein POLY, each X', each (z'), each R^1, each R^2, and each R^3 are as previously defined.

84. A carboxylic acid or ester thereof comprising the following formula:



wherein:

R^1 is H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl;

Q is a residue of a polyhydric alcohol having x+y hydroxyl groups;

R^2, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl;

R^3, in each occurrence, is independently H or an organic radical selected from the group consisting of alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, and substituted aryl;

(x) is one to 20;

(y) is one to 20; and

(z) is four to 20.

85. A gel comprising the polymer of claim 57 or claim 58.